

1 CLAIMS:

2 1. A system for sensing and recording or transmitting processing conditions
3 comprising:

4 a substrate having a surface, the substrate comprising sensors to measure the
5 processing conditions of the substrate at different areas of the substrate; and

6 one or more electronics platforms mounted to the surface of the substrate
7 comprising signal acquisition circuitry coupled to an output of the sensors.

1 2. The system of claim 1 wherein each of the one or more platforms
2 comprise one or more legs and a shelf, the one or more legs elevating the shelf from the
3 surface,

1 3. The system of claim 2 wherein the signal acquisition circuitry is upon the
2 shelf.

1 4. The system of claim 1 wherein the substrate is a wafer.

1 5. The system of claim 1 wherein the substrate comprises glass.

1 6. The system of claim 1 further comprising a remote data processing
2 module.

3 7. The system of claim 2 wherein the electronics platform further comprises
4 data transmission circuitry comprising a transceiver, the data transmission circuitry
5 operable to transmit the processing conditions in real time during measurement of the
6 processing conditions to the data processing module via the transceiver.

1 8. The system of claim 7 wherein the transceiver transmits and receives RF
2 signals.

1 9. The system of claim 7 wherein the transceiver transmits and receives IR
2 signals.

1 10. The system of claim 7 wherein the transceiver inductively transmits and
2 receives.

1 11. The system of claim 7 wherein the transceiver sonically transmits and
2 receives.

1 12. The system of claim 7 wherein the system further comprises a data
2 transmission cable and wherein the data transmission circuitry transmits the processing
3 conditions over the cable.

1 13. The system of claim 7 wherein the data transmission circuitry is further
2 operable to send and receive control signals to and from the data processing module.

1 14. The system of claim 6 wherein the data processing module comprises a
2 microprocessor, a storage device, a display, and an input device.

1 15. The system of claim 1 wherein the processing conditions measured by the
2 sensors comprise one or more of the following conditions: temperature, pressure, flow
3 rate, vibration, ion current density, ion current energy, and light energy density.

4 16. The system of claim 1 wherein the sensors are discrete sensors mounted in
5 or on the wafer.

1 17. The system of claim 1 wherein the sensors are part of an integrated circuit
2 formed in or on the wafer.

1 18. The system of claim 1 wherein the electronics platform further comprises
2 a power supply.

1 19. The system of claim 17 wherein the power supply comprises an inductive
2 power source.

1 20. The system of claim 1 further comprising an antenna connected to the
2 wafer and electrically coupled to the signal acquisition circuitry.

1 21. A process condition monitoring device comprising:
2 a substrate having a first perimeter, the substrate comprising sensors to measure
3 the processing conditions of the substrate at different areas of the substrate; and
4 an electronics module having a second perimeter, the module comprising:
5 signal acquisition circuitry coupled to an output of the sensors;
6 data transmission circuitry coupled to the signal acquisition circuitry;
7 a power source; and
8 leads connecting the substrate to the electronics module for transmitting signals
9 between the substrate and the electronics module.

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1 22. The monitoring device of claim 21 wherein the signal acquisition circuitry
2 is configured to amplify an output signal of the sensors.

1 23. The monitoring device of claim 21 wherein the data transmission circuitry
2 comprises a micro-controller and is configured to correct the output signal using sensor
3 calibration coefficients.

1 24. The monitoring device of claim 22 wherein the signal acquisition circuitry
2 is further configured to provide an input signal to the sensors.

1 25. The monitoring device of claim 24 wherein the input signal comprises
2 input power.

1 26. The monitoring device of claim 21 further comprising a remote data
2 processing system, and wherein the data transmission circuitry comprises a wireless
3 transceiver to transmit the processing conditions to the remote system.

1 27. The monitoring device of claim 22 wherein the data transmission circuitry
2 comprises an analog to digital converter.

1 28. The monitoring device of claim 21 wherein the data transmission circuitry
2 comprises memory, and wherein the data transmission circuitry stores processing
3 conditions in the memory.

1 29. The monitoring device of claim 26 wherein the remote system is
2 configured to adjust the output signal using calibration coefficients.

1 30. The monitoring device of claim 21 wherein the transceiver transmits and
2 receives RF signals.

1 31. The monitoring device of claim 21 wherein the transceiver transmits and
2 receives IR signals.

1 32. The monitoring device of claim 21 wherein the transceiver transmits and
2 receives sonic signals.

1 33. The monitoring device of claim 21 wherein the data transmission circuitry
2 comprises one or more connectors to couple a remote system to the device with a
3 communications cable.

1 34. The monitoring device of claim 26 wherein the remote system is a
2 microprocessor controlled device.

1 35. The monitoring device of claim 21 wherein the processing conditions
2 measured by the sensors comprise one or more of the following conditions: temperature,
3 pressure, flow rate, vibration, ion current density, ion current energy, and light energy
4 density.

1 36. The monitoring device of claim 21 wherein the flexible cable is a ribbon
2 cable.

1 37. A device for monitoring processing conditions to be inserted by a robot
2 hand into a sealed chamber, the device comprising:

3 a first member comprising sensors;
4 a second member comprising electronics;
5 a conductive cable or conductors connecting the first and second members,
6 wherein the first and second members fit into or onto a robot hand or hands, and
7 wherein the device can be extended to a second position by the robot hand such
8 that the first member is inside the sealed chamber and the second circular member is

9 outside the chamber, thereby not subjecting the electronics of the second member to the
10 conditions within the chamber.

1 38. The device of claim 37 wherein in the second position the cable of the
2 device is sealed at a door of the chamber.

1 39. The device of claim 37 wherein the electronics comprise a power supply,
2 and an amplifier.

1 40. The device of claim 39 wherein the electronics further comprise a
2 transceiver for communicating to a data processing device.

1 41. The device of claim 39 wherein the electronics further comprise an
2 analog-to-digital converter.

1 42. The device of claim 37 wherein the device further comprises a data
2 processing computer coupled to the second circular member.

1 43. The device of claim 37 wherein the first and second members are circular
2 or rectangular.

1 44. The system of claim 1 wherein the electronics platform is mounted to a
2 recessed portion of the surface of the substrate, wherein the recessed portion and the
3 platform are within a cavity and wherein the platform is substantially equal in mass to the
4 removed cavity.

1 45. The process condition of claim 21 wherein in a first position the
2 electronics module is above or below the substrate, and in a second position the

- 3 electronics module and the substrate are displaced from each other such that the first and
- 4 second perimeter do not intersect.